KEELE UNIVERSITY
Sustainability Report
2016

Keele University

CONTENTS AND CONTACTS

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INTRODUCTION BY THE DEPUTY VICE-CHANCELLOR AND PROVOST

Professor Mark Ormerod, Deputy Vice Chancellor and Provost, Keele University

This is the fourth University Sustainability Report, and it demonstrates the considerable strides and continuous improvement that Keele has made over the last two years in the area of sustainability, and the breadth of sustainability activities across all the University's activities, reflecting our very strong institutional commitment to sustainability. We have seen significant progress across all aspects of sustainability, ranging from embedding sustainability within discipline curricula, with a strong commitment to give all our students an increased awareness of sustainability, continued growth of research and innovation in sustainability, highlighted by strong performance in the Research Excellence Framework and a number of significant grant successes, and continued successful campus developments and initiatives and carbon reduction.

One real highlight was the student-led bid to host the prestigious annual World Student Environmental Network Global Summit at Keele (in partnership with Sussex University) in July 2016, which will be a superb conference and a fantastic experience for all the student delegates coming to Keele from all areas of the world. Our students have put together a really outstanding and stimulating programme. Being shortlisted for four Green Gown Awards in 2016 is a great achievement and highlights both the quality and breadth of our sustainability activities.

Looking forwards our proposed development of the first 'at scale' Smart Energy Network Demonstrator in Europe is hugely exciting, and will provide a genuinely world-class facility for smart energy research and development, in partnership with business and industry. We have also made significant progress in forming new international networks and partnerships demonstrating our increasing international reputation for our holistic, whole-institution approach to sustainability.

Although I am the University's strategic lead for Sustainability, sustainability leadership in these issues comes from all levels, from our Chancellor **Jonathon Porritt CBE**, through to individual module leaders embedding sustainability into their teaching, through to the staff ensuring that their practices are more sustainable. My continued thanks goes to all our staff and students for their continued personal and professional commitment to helping Keele become a more sustainable university.

I am confident that over the coming year we will see further progress and successes and achievements across all areas of sustainability, and increased partnership activities, as we aim to be the most environmentally sustainable campus university in the UK.

Professor Mark Ormerod

Deputy Vice-Chancellor and Provost, Keele University

Professor Mark Ormerod

Jonathon Porritt, CBE
Chancellor, Keele University

1. VISION AND KEY ACHIEVEMENTS

2015 saw the publication of the new University Strategic Plan, with Sustainability featuring very prominently in the new strategy, with a separate aim devoted to sustainability. Aim 5 of the new Strategic Plan is:

"To promote environmental sustainability in all that we do"

This goes on to detail particular aims for sustainability across all of the relevant areas including campus developments and carbon reduction; research and innovation; education; and leadership in our communities. In addition, the Strategic Plan outlines three sustainability 'transformation projects' aimed at raising our sustainability activity to a new level and enhancing our sector leading reputation. These are to:

- promote a portfolio of environmental sustainability student projects and encourage postgraduate studentships through a new University Research Centre in Environmental Sustainability;
- develop a range of alternative energy sources utilised on site to reduce our carbon footprint and underpin research and education programmes associated with environmental sustainability;
- establish a Smart Energy Network Demonstrator (SEND) as a national demonstrator and focus for research on the dynamic management of energy resources around a complex residential and commercial site.

We have also made a firm commitment to educate all our students about sustainability as well as providing opportunities, in partnership with the Students' Union, for them to gain experience in implementing sustainability strategies. With over 40 years of working life ahead of them in many cases our students are, along with our research and external engagement, arguably where we as an institution will have the greatest impact on sustainability, and so it is essential that our graduates are well-educated and prepared to make sustainable decisions throughout their personal and professional lives.

Since the last Sustainability Report there have been many successes in our sustainability activities. Some highlights include:

- winner of the Institutional Leadership Award in the Green Gown Awards, for Pat Bailey, the then Pro Vice-Chancellor for Environment & Sustainability, in 2014. Pat has since left Keele, and his responsibilities for leading sustainability at an institutional level have been taken on by Professor Mark Ormerod, Deputy Vice-Chancellor and Provost and Professor of Clean Technology;
- highly commended in 2014 in the competitive 'Continuous Improvement: Institutional Change' category of the Green Gown Awards. This application emphasised the role of cultural shift, partnership and empowerment within the University to drive change to become a more sustainable university in all that we do;
- successfully bidding (jointly with Sussex University) to host the prestigious annual World Student Environmental Network Global Summit in July 2016;
- a new student-led 'veg box' scheme, set up by the student-led 'Keele Food Co-Operative'. This provides organic fruit and vegetables and local veg to staff and students on campus at a fraction of the cost of major supermarkets, and with no need to travel off campus;
- an ethical shopping guide for students stemming from three successful years of the Sustainable fashion show run by the Students' Union;
- shortlisting of four projects for the 2016 Green Gown Awards, including Sustainability Champion - staff (Dave Emley); Sustainability Champion – student (Ulrich Pohanka, for his leadership of the Keele Food Co-operative and other initiatives); Learning and Teaching for our 'dropping' of sustainability education into all that we do; and Carbon Reduction for our long running and extensive series of projects leading to significant carbon reductions;
- publication of David Emley's 'Natural History of Keele University', detailing 40 years of Dave's natural history observations on the University campus.

This report provides a summary of some of our key sustainability achievements over the last two years. These are described in detail in over 12 sections, demonstrating how sustainability reaches into every part of what we do.

At a time of reduced leadership for sustainability, including from within the Higher Education sector, this is a time for leadership to come from within Universities, who at such times have even greater responsibility as moral and intellectual leaders in society.

One of our biggest and most exciting projects is the development of a campus-wide Smart Energy Network Demonstrator (SEND), which will be the first at scale demonstrator in Europe. £5 million has been secured from the Department of Business, Innovation and Skills and the Department of Energy and Climate Change as part of the Stoke-on-Trent & Staffordshire 'City Deal'. This Government investment, together with further significant funding being sought from the European Regional Development Fund and the private sector, will provide a genuinely world-class facility for smart energy research and development, enabling collaboration with business and industry, and the testing and evaluation of new and evolving smart energy network technologies, bringing specialised jobs to the area.

The annual Sustainability Fashion Show in progress

The Sustainability Fashion Show was a Finalist in the Green Gowns Social Responsibility category in 2014

The student-led Keele Food Cooperative selling their organic fruit and veg bags

2 . STUDENT ENGAGEMENT

Keele's Students' Union provides students with many opportunities to get involved with sustainability activities. Some of the highlights are featured below.

Growth in Student engagement and the first 'Blackout'

Student engagement with sustainability at Keele continues to grow and grow, with even more events and initiatives taking place led by staff, the Students' Union, and students themselves, reaching ever more students. This growth is in part due to a task-and-finish group set up in 2014 to focus on further encouraging student engagement. The group comprised of student and academic representatives, and representatives from the Sustainability Hub, Students' Union Activities team, the Education for Sustainability team, and the Estates Environmental Manager. Together they collaborated on a number of projects, most notably Keele University's first 'Blackout' event to celebrate Earth Hour, drawing on the idea developed at Southampton University. The concept is simple: for teams of volunteers to visit buildings around campus when the majority of people have gone home in order to record and turn off what appliances have been left on. In the first year this was run, in two hours, they found over 300 lights, 200 computers and 41 appliances left on in empty rooms! This has been carried on as an annual event attracting many student volunteers.

The Sustainable Fashion Show and Society 'stripes'

The Students' Union have led on a number of exciting sustainability initiatives over the past year. Following the success of their Sustainable Fashion Show in 2013, which aimed to make students aware of current ethical issues and how to make more sustainable choices when making purchases, they ran another in 2014 and 2015, including ethical stalls, models and catwalk performances raising hundreds of pounds for the charities they were supporting. One additional outcome of the fashion show was an "ethical shopping" guide that the students developed in collaboration with the Students' Union Activities team. These events were shortlisted for a prestigious national 'Green Gown' Award in the Social Responsibility category. The National Union of Students (NUS) also showcased the Students' Union's 'Sustainability Stripe' initiative on their website. This initiative, along with the Inclusion, Community and Development Stripes, encourages any club or society at Keele to apply for the 'stripe' accreditation if they have demonstrated consideration of these important issues in regards to their resources and activities.

Think: Green and the new veg box scheme

The **Think:Green** (also known as Keele in Transition) student-led service has paved the way for a truly exciting, entirely student-led organic Fruit and VegBox scheme, with all vegetables coming from the UK. All produce is organic. The produce is purchased in bulk and sold at low cost to staff and students. So far the scheme has sold 1114 bags of vegetable and 1150 bags of fruit, that's 6.4 tonnes of organic fruit and veg sold, to 190 unique customers! There are hopes to expand the project in the future with the purchasing of dried goods, as well as looking to the **Student Eats** gardening project to provide produce for the scheme. This scheme builds on the growing interest in food and food growing on campus, reflected by the continuation of the **Sustainable Student Bungalow** project, where four new students every year commit to living in the bungalow as exemplars of sustainable student living growing significant quantities of food in their raised beds and polytunnel, and sharing this produce and knowledge with the wider student community.

Reaching international and faith groups

There are many events and activities that occur on the University campus throughout the year that attract a wide range of students. In order to continue to reach wider student (and staff) audiences we work with teams leading on different events in order to integrate sustainability themes. Two highlights have included integrating sustainability into the annual World Festival and integration with the university's faith groups. As part of one World Festival we integrated the aim of raising awareness of global environmental and sustainability issues. International students were invited to share, compare and learn from each other's experiences in their home countries, and engage in fun games and a photo competition on global environmental issues. Sustainability issues were raised with Keele's faith groups, through a film screening of 'God is Green' by Mark Dowd and Bruno Sorrentino, and food sharing at the Keele Chapel. This event was attended by Anglican, Catholic and Sikh groups and gave the opportunity to enjoy good food, and share understandings of sustainability from within different religious traditions.

Green Student Academic Representatives (StARs)

In 2013 as part of the Green Impact programme the Law School developed the idea of having 'green' Student Academic Representatives, who would feed in sustainability-related concerns and issues to the Staff Student Liaison Committee. This idea was taken up by the Students' Union (who run the StARS) scheme, who recruited approximately 20 students from a wide range of disciplines to act as Green StARs. These students received training on sustainability issues to consider from the amount of paper involved in the production of teaching materials, the disposal of waste in practicals, to the coverage of sustainability issues in their curriculum.

World Student Environmental Summit

Since 2013 students at Keele have been invited to attend the World Student Environmental Summit. Students have come back brimming with ideas to make change at Keele. As a result of these experiences, Keele was successful in bidding jointly with the University of Sussex to hold the World Student Environmental Summit in 2016! This is an ambitious undertaking for a student team, and demonstrates impressive partnership working between the two Universities.

Student Eats

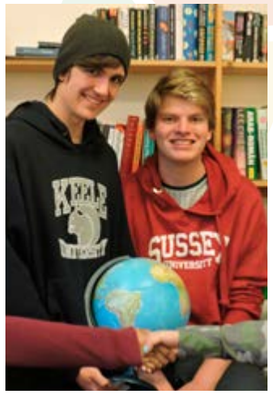
Food growing on campus continues apace. Keele is taking part in the National Union of Students' 'Student Eats' scheme, which aims to support student food growing initiatives. Keele has a series of raised beds in the Walled Garden, two of which are maintained by the Student Eats group who meet every Fridays at 12.30.

STUDENT EATS!

And...

In addition to all these new achievements, there continues to be engagement on sustainability through an annual Green Week, the Students' Union's volunteering scheme, a new group of students in the Sustainable Student Bungalow every year, Keele's Young Greens Society (with connections to the Green Political Party), the Vegan and Vegetarian Society, and a dedicated Green editor for the student newspaper, Concourse.

Conservation volunteering as part of Keele 'Make a difference day'



Some of the organising committee demonstrating the partnership theme of the WSES conference

Students with their produce in the Student Eats allotment

3. SUSTAINABILITY IN THE CURRICULUM AND STUDENT EXPERIENCE

Our approach to embedding sustainability in the curriculum

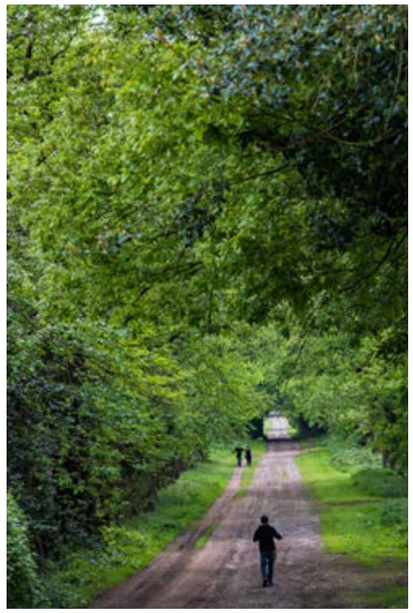
Keele is committed to embedding sustainability into the whole experience of our students, from embedding sustainability into all of our educational programmes, to offering co-curricular sustainability opportunities for all students, to developing a culture of sustainability through the campus environment in which students study and live. As a key part of the strategy for embedding sustainability education into the curriculum and culture of the University devised during Keele's participation in the HEA's Green Academy Change programme in 2010/11, sustainability was named as one of three core themes (alongside employability and internationalisation) in the Distinctive Keele Curriculum. As a result of this, and the presence of a sustainability theme in the Keele graduate attributes, all programmes are required to address sustainability through their curriculum, whilst additional opportunities for students to engage in these areas are also sought in various co-curricula offerings. As we move on in 2016 from the Distinctive Keele Curriculum, to defining our distinctive educational approach, sustainability remains a key theme of our approach to the overall student educational experience.

By 2020 Keele aims for all students to be able to articulate engagement with sustainability during their time at university when they graduate, showing an overall improvement in student sustainability awareness against a 2015 baseline.

Putting sustainability at the heart of the curriculum and student experience at Keele follows a multi-stranded approach covering the following areas:

- ***Integration into the undergraduate curriculum***, including being embedded in all undergraduate programmes, and providing sustainability elective offerings and sustainability-focused degree programmes.
- ***Integration into the postgraduate taught curriculum and postgraduate research student training programmes.***
- ***Co-curriculum opportunities*** working in partnership with the Students' Union, providing support for student sustainability societies and student-led projects, integration into existing society and activities structures, and 'green themes' in other university wide events
- ***Staff development***, through one-to-one consultation and support, Education for Sustainable Development (ESD) workshops tailored for different disciplines and for new lecturers, and online training in ESD.

In addition, the Education for Sustainable Development strategy highlights the needs for integration with the rest of the University. For example, strong links exist between the Estates and Education for Sustainability team, with students carrying out coursework projects which feed into the management of the estate, while providing the students with experience of dealing with real data and problems. The overall aim is to embed sustainability into many different areas of activity in the University so it truly becomes part of every staff and student's experience at Keele and part of the very culture of the institution.



Case studies of Education for Sustainability

Education for Sustainability conferences

Keele has hosted two more external HEA funded conferences on Education for Sustainability, following the Student Action for Sustainability conference at Keele in 2013. One entitled 'New to ESD: Integrating Education for Sustainable Development in teaching and the student experience' was aimed at staff wanting to find out more about the area, and involved a number of external speakers talking about how they have embedded sustainability into their subject areas, ranging from English, to Business and Advertising. The second workshop showcased Keele's achievements and approach to embedding sustainability in all our activities, and involved a tour of the University grounds for a number of external visitors. These externally-funded workshops complemented the suite of ongoing staff development workshops delivered for Keele staff by the Education for Sustainability team.

Environmental and Sustainability degree programmes

There are currently three environmental and sustainability-focussed undergraduate

Conference guests learning about how we use our campus in teaching

programmes: a social science-focussed dual honours 'Environmental Studies' run by the School of Politics, International Relations and Environment; a science-focussed dual honours and single honours 'Environmental Science'; and a single honours interdisciplinary BSc programme in 'Environment and Sustainability' run by the School of Physical and Geographical Sciences. Both the Environmental Science and Environment and Sustainability programmes have been accredited by the Institution of Environmental Sciences, and include the option of four year programmes with a work placement year between the second and final year.

At postgraduate level there is a MSc in Environmental Sustainability and Green Technology, strongly linked to the work with business at the Sustainability Hub, and there is an MA programme in Environmental Politics and Climate Change, run from the School of Politics, International Relations and Environment.

Examples of discipline-specific sustainability modules

A number of disciplines which may not traditionally be associated with sustainability have started to integrate sustainability into their teaching programmes in a big way. In 2011/12 the School of Pharmacy started a module called 'Sustainable Pharmacy', led by Dr Tony Curtis, as a third year option module as part of the MPharm degree and have since further embedded sustainability into core teaching for a wider number of pharmacy students. The single honours chemistry route has also introduced a core module called 'Sustainable Chemistry', led by Dr Katherine Haxton, which looks at the associated environmental implications of chemistry in everyday life and the sustainability of chemical processes.

Sustainable healthcare

During 2015-16 the School of Medicine introduced 'Sustainable Healthcare' to Year 3 of the MBChB programme. Led by Dr Stuart McBain and developed in conjunction with both the Sustainable Health Education (SHE) network and the University Hospitals of North Midlands (UHNM) NHS Trust, it provides an opportunity for students to develop their understanding of the core principles of sustainable practice and consider their role as future leaders in the development and delivery of sustainable healthcare. The sessions are delivered in collaboration with Dr Cliff Shelton from Lancaster University and the Sustainable Development Steering Group based at UHNM. The programme has been well received by students and will form the basis of a new strand within the undergraduate medical curriculum.

A cohort of BSc Environment & Sustainability students on a field course to the Centre for Alternative Technology

“I didn’t believe as an individual I could make a difference but now I know that I can”

Quote from student taking ‘Greening Business’.

Examples of sustainability electives

In addition to embedding sustainability in core programmes, there are also a number of sustainability-related electives which can be taken by any student. These include: ‘Greening Business: employability and sustainability’ which aims to give students the skills and motivation to drive positive sustainability change in organisations while developing recommendations to improve the sustainability of the university campus; ‘Global Warming or a New Ice Age’, which encourages students to look critically at how the media portrays climate change messages and the science behind climate change and some of the commonly perceived myths; ‘Environmental Ethics’ which engages students with the key debates and questions in the ethics of the environment; and ‘The third sector: making a difference’ in which students gain understanding and experience of the importance that the third sector contributes to communities, locally, nationally and internationally.

Sustainability-discipline linkages in subject ‘Away Days’ and programme support

The University’s Student Learning team have work with individual programmes to design bespoke half-day workshops in years one and two aimed at addressing key skills, such as oral presentations, time management, and note taking. The Education for Sustainability team have worked with the curriculum development and programme teams to embed sustainability-discipline linkages into some of these workshops. Some examples include: Media, Communication and Culture students developing blogging skills through looking at media representations of climate change; Chemistry and Medicinal Chemistry students learning about the principles of Green Chemistry at first year while developing negotiation skills, and at second year considering sustainability issues with Eco-labelling of products while developing presentation skills targeted at a particular audience; and Physiotherapy students practicing their note-taking skills at a mock NHS Sustainable Development Unit conference. Other subjects which have embedded sustainability in this way include Physics and Astrophysics, and Politics.

In addition to these workshops the ESD team have worked with several other programmes to embed sustainability through different means. This has included delivering sustainability-related sessions as part of a professional practice course to Midwifery students, and contributing to the programme for nursing students. Computer Science students have been given the opportunity to carry out their dissertation projects on a range of sustainability topics, working with a computer science and ‘sustainability’ supervisor.

Online training in Education for Sustainability

An online training tool has been developed by the Education for Sustainability team in order to help staff learn about Education for Sustainability in their own time and at their own rate as an alternative to attending a staff development workshop. This online tool covers the historical background and drivers to the ESD agenda, as well as suggestions on how sustainability can be embedded in teaching. This course called ‘embedding sustainability through your teaching: an introduction to higher education for sustainable development’ is available to staff through the Keele Learning Pool.

Responsible Futures kitemark

In 2015 Keele was one of the institutions in the pilot cohort to achieve the National Union of Students Responsible Futures kitemark accreditation. This scheme requires institutions to complete a number of criteria relating to Education for Sustainability in order to achieve accreditation to this kitemark. Keele achieved over double the threshold number of points necessary to qualify for the kitemark!

nus Responsible Futures Accredited institution

For further information of sustainability curriculum developments and projects at Keele contact Dr Zoe Robinson, Director of Education for Sustainability **z.p.robinson@keele.ac.uk**

4. RESEARCH

Sustainability is a key thematic priority area for research at Keele University. Sustainability research spans across the three Faculties at Keele, with a range of disciplinary focussed and interdisciplinary sustainability research. One of Keele’s real strengths is that its sustainability research involves academic staff from many Schools and disciplines, including environmental science, earth science, physical and human geography, life sciences, chemistry, mathematics, computer science, psychology, politics and international relations, law, sociology and social policy, education, film and media, economics, and business and management amongst others!

There is no distinct Unit of Assessment for sustainability within the Research Excellence Framework, with units of assessment being largely on single discipline lines. Thus staff undertaking research in different areas of sustainability formed part of the submissions to three different units of assessment in 2014 (Earth Systems and Environmental Science, General Engineering, and Politics and International Studies). Keele’s submission to the 2014 REF saw a submission under an explicitly environmental unit of assessment for the first time.

In order to drive forward a new phase of focussed-sustainability research, in line with the development of the Smart Energy Network Demonstrator at Keele, two new Professor appointments have recently been advertised to lead the development of the Smart Energy Network Demonstrator and to head a new collaborative research and development centre with business and industry.

Some sustainability research highlights are given below:

Keele University Sustainability Research Network

Keele University’s Sustainability Research Network (KUSRN) was set up to raise the profile of sustainability research across the institution, to bring together researchers from different disciplines who are researching sustainability issues, and to provide support to the sustainability-related PhD students who are based in many different Schools across the University . A key aspect of the research network has been the KUSRN seminar series, which is the university’s first cross-faculty interdisciplinary sustainability seminar series. The first two series of talks have seen 22 diverse and stimulating research seminars, covering many aspects of sustainability-related research being undertaken at Keele, ranging from sustainable energy, environmental policy and ecology, to environmental history, eco-psychology, environmental education and sustainable computing. The talks have attracted over 350 attendees in total, with some very interesting and lively debates taking place!

The Centre for Understanding Sustainable Prosperity (CUSP)

CUSP is a £6m ESRC-funded research consortium exploring the economic, ecological, social and governance dimensions of sustainable prosperity. It explores alternative visions of a sustainable future where individuals and communities have the capabilities needed to flourish while living within the ecological and resource constraints of a finite planet. The five-year programme is directed by Professor Tim Jackson (Surrey University) with the universities of Keele, Leeds, Middlesex, Goldsmiths and Anglia Ruskin. At Keele, researchers within the School of Politics, Philosophy, International Relations and Environment (SPIRE) are leading two projects:

- *GRASSROOTS TRANSITIONS – PREFIGURING SUSTAINABILITY*

This research will explore the dynamics of associational activity directed at sustainability and examine the complex relationship between formal governmental systems and social movement initiatives. It will do this through exploring traditions of small-scale sustainability initiatives and the contested meanings to local community members and environmental activists.

- *THE POLITICAL FOUNDATIONS OF SUSTAINABLE PROSPERITY*

This project explores the implications of redefining prosperity on forms of governance in general, and democracy in particular. This research will contribute to the debate about the ‘green state’ and assess how political institutions, culture and practices both challenge sustainable prosperity and create space for alternatives. Sustainable prosperity raises particular questions for the nature of democracy in the context of the need for urgent action related to averting environmental disaster, and the need for intellectual freedoms

4. RESEARCH (CONTINUED)

that challenge dominant interests and present social and political alternatives. It will do this at a range of scales from the very local, to national and international institutions.

Keele Researchers: Dr Phil Catney; Professor Brian Doherty; Dr Marit Hammond

For further information: **p.j.j.catney@keele.ac.uk** and **www.cusp.ac.uk**

Global Change and Resilience of Biogeochemical Functions in Ecosystems

Current research led by Dr Sami Ullah places a significant impetus on the mechanistic understanding of ecological functions to identify thresholds of perturbations caused by climate and land use changes beyond which the sustainability of key biogeochemical functions are compromised. A recent NERC funded multidisciplinary project identified risks of chronic pollution of peatbog and forest soils in response to atmospheric deposition of reactive nitrogen and identified management and policy actions at catchment scale that could help mitigate such risks. A project funded by the Estonian Research Council is evaluating the implications of drainage and agricultural intensification for escalating greenhouse gas emissions from peatbogs globally. An on-going Royal Society, NERC and British Byrological Society funded project is investigating the influence of global change issues on bacterial nitrogen fixation in peatbogs to establish the 'break and make thresholds' of this function to help forecast the future functioning of peatbogs under climate change scenarios. The overall fundamental research under this theme is contributing to the necessary scientific framework for reaching informed policy decisions of ecological sustainability and resilience of terrestrial and aquatic ecosystems.

Sustainability and Film Studies

Dr Neil Archer (Lecturer in Film Studies) is currently working on two projects, looking at the aesthetics and politics of the environment in contemporary popular cinema. The first project expands on a section of his recent book *The Road Movie: In Search of Meaning* (Wallflower, 2016), which considers the intersection of science fiction and the road genre to create new 'estranging' paradigms of mobility and vision within the contexts of environmentalism and ecocritical theory. The second article looks at the ways 'apocalyptic' science fiction reflects and explores the contexts of environmental politics, in terms of how the genre manages consensus and disavowal, or alternately, highlights the failures of collaborative global action.

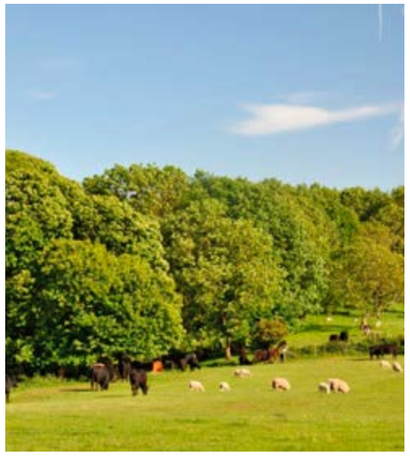
Media Environments

Media Environments' workshop

Staff from the departments of Media Communication & Culture and Film Studies (Dr Eva Giraud, Dr Pawas Bisht & Dr Neil Archer) organised a workshop in May 2016, which explored the relationship between environmentalism and media. The event generated vibrant dialogue between participants from the fields of academia, media practice and activism. Topics ranged from environmental politics and ethics in documentary film and photography, to tear gas activism. Speakers included Professor Claire Molloy, Dr Anna Feigenbaum and Dr Conohar Scott. The day also included a screening of *Nuclear Hallucinations* by Fathima Nizaruddin, and a pamphlet design workshop led by Dominic Latham (*Minuteworks graphic design*). The day was supported by the Humanities and Social Sciences Faculty Research Office at Keele.

Fordhall Farm Community Land Initiative Research

Dr John Hegarty (Senior Lecturer in Psychology) and PhD Candidate Grant Bosworth are working in partnership with Fordhall Farm (Shropshire) to assess the impact of a community land initiative. The study considers the opinions of more than 400 people who, together as a community, raised nearly £800,000 to purchase the land required to keep Fordhall farm running. The research highlights the positive impact Fordhall has had on their willingness to engage with other similar projects in their community (e.g. involvement with local vegetable schemes, charitable organisations) and their own personal views relating to the environment (e.g. appreciation for nature).



Fordhall farm

Flood Defence Planning, Myths of the Scottish Highlands, and UK allotments.

Dr Andy Zielenic (Lecturer in Sociology) is developing a range of sustainability projects. The first focuses on flood defence planning in the riverside Whitesands area of Dumfries. It looks at the historical legacies of river management, the processes of designing, planning and implementing a Flood Management/Prevention Scheme as an integral element of an overarching urban regeneration master-plan, the complexities and conflicts arising from the competing aims and priorities of a variety of stakeholders, all within the context of economic austerity, budget constraints and concerns with the impacts of climate change.

The second project looks at the competing realities of Scottish rurality using statistical data, photographs, literary and cultural sources combined with a sociological analysis based on site visits and interviews, to reflect the reality of rural poverty and (under) employment, expensive or inadequate services and infrastructure, isolation, depopulation, absentee landlords and corporate owned estates, etc. versus the mythic idealism of the Scottish countryside.

The third project investigates the meanings, values and benefits that allotment users and providers express for their participation in urban gardening schemes.

What are the meanings, values and benefits of allotments and urban gardening schemes?

4. RESEARCH (CONTINUED)

Student Recycling Behaviour

PhD student Grant Bosworth's PhD research investigates how to increase recycling rates at institutions such as universities. His work involves tailoring messages sent to students using apps and other smart technologies. The aim of his research is to see whether personalising the content of a message to be more congruent with the values of an individual, can increase their engagement with pro-environmental behaviour. So far his research has evaluated the attitudes and behaviour of over 400 students at Keele and at a partner university in Brazil.

Plastisphere

Dr Deirdre McKay has continued to develop her work on recycled plastic crafts. She has explored how the features of plastic materials express conceptions of the self and visions of sustainable futures in the Philippines, publishing in a key interdisciplinary volume, The Social Life of Materials (eds. Drazin, A. & Kuecher, S., Bloomsbury, 2015) and giving an invited talk in the Netherlands.

Sustainable governance in Africa

Dr Michael Musgrave's research looks at governance conflicts over natural resources and attempts to develop more comprehensive theory around governance that allows for more diverse and innovative governance arrangements. Michael's research uses case studies of both bad and good examples of traditional governance to highlight the potential for traditional governance to change and work alongside local government to manage natural resources sustainably.

Education for Sustainable Development and New Public Management in Universities

Sophie Bessant , PhD student and Educational Developer in the Learning and Professional Development Centre, is researching the relationship between the Sustainability and Education for Sustainable Development (ESD) agendas of universities in England and increasing marketisation and managerialism in the sector under Neoliberal and New Public Management political-economic influence. Sophie's research explores the contradictions and the synergies between these ideologies and practices 'on the ground' within universities and how this relationship has influenced the pursuit, practise and development of sustainability and ESD agendas over the last ten years. Sophie's research is based on 56 semi-structured interviews with relevant professionals across eight English universities and a range of HE organizations and bodies.

This represents just a snapshot of the sustainability research being carried out at Keele

5. GROUNDS AND BIODIVERSITY

The University campus is situated in 617 acres of land including lakes, acres of woodland and a wide variety of sports facilities. The campus is also home to the National Collection of Cherries, with currently around 230 species growing here.

2014 saw the arrival of a new Head of Grounds, Jane Barker committed to the developments of Keele's extensive grounds and keen to ensure the vibrancy of the campus, and the consideration of both biodiversity and educational purposes in its management.

In order to conserve and enhance the biodiversity of this unique estate the Natural Estates Advisory Group has been developed. It includes representatives from the Grounds and Estates team and University Academic experts and its role is to actively harness and focus the energy of people who use the campus to develop and encourage real, tangible improvements to the campus environment and its biodiversity. Keele's grounds make it the perfect 'living laboratory' for students to study biodiversity and learn about the value of the natural world and how to protect and enhance it, without the need to travel off campus. The Grounds team have also worked extensively with the students at the Sustainable Student Bungalow and with students on the allotment areas in the Walled Garden.

The Grounds team and Natural Environment Advisory Group have reviewed practical issues such as the grass cutting programmes to increase areas for conservation and natural flora developments where possible. Some areas of the campus had their regimes changed to match the needs of the grass throughout a very hot, dry summer, leading to a literally greener campus!

A walk for staff and students showing off the National Collection of Cherry Trees

Working alongside our Arboriculturalist consultant the Grounds team have been developing a Woodland Management Plan which will allow us to drive forward key works to improve the health and quality of the many fine trees Keele campus is home to.

After a number of years trying to control the *Phytophthora ramorum* infection, with the support of the Forestry Commission and FERA (Food and Environment Research Agency) the important decision was made to remove all the *Phythophthora ramorum* host plants from the woodlands. This has led to the removal of approximately 1600 Larch trees and thousands of *Rhododendron ponticum* plants. The work was completed in October 2015 and provides the exciting potential to monitor the regeneration of this area as well as an opportunity to replant species to enhance the arboretum and the biodiversity of the estate.

Proposals are in place to continue to review the Grounds Programme and to develop plans to work with volunteers from the local community, students and residents to help control the invasive weeds present at Keele including Japanese Knotweed and Himalayan Balsam.

There are also plans to increase the quantity of fruit bushes and trees throughout the Halls areas of the campus to enable students and residents to have access to their produce in the future.

A Memorial Garden is also being developed. A place dedicated to trees planted in remembrance of former users of the campus, a place of contemplation, and also a place for new tree planting to be used by the educational staff on the campus as a teaching resource for tree identification.

Dr Sarah Taylor, Lecturer in the School of Life Sciences, has been using the Keele arboretum to experiment with the use of mobile devices and tree identification apps, to enhance the species identification skills of students, a key ecological skill sought for by employers.

2014 saw the launch of a book by Dave Emley, School of Physical and Geographical Sciences, entitled 'The Natural History of Keele University', summarising Dave's 40 years of observations of the flora and fauna of the Keele estate.

Students at work on the allotments in the Walled garden

At work in the polytunnel at the Sustainable Student Bungalow

Dave Emley has been shortlisted for the 'Staff Sustainability Champion' Green Gown Award, very well deserved for his decades of voluntary work to improve the biodiversity of the University Estate and the communication of this to the University's staff, students and visitors.

2014 also saw the official opening of the National Cherry Tree Collection on Keele campus. Keele currently has over 240 varieties of cherry tree, a collection which has grown form the first ornamental plantings in the 1940s.

It is an exciting time to be part of the Grounds team at Keele and there are many initiatives still to be developed in the coming years.

Official opening of the National Cherry tree collection

6. ENERGY, WATER AND CARBON EMISSIONS

One of the key challenges Keele faces is meeting our environmental sustainability ambitions whilst also growing the number of students on campus and the services on offer. The University has set a strategic goal to increase student numbers by 30% by 2020. To help achieve this we are investing in new state-of-the-art laboratories, student accommodation, commercial facilities and upgrades to existing building spaces to provide the facilities on campus which will attract future students and contribute to the all-important student experience. This growth and development of the campus will make meeting absolute carbon reduction targets challenging however we will continue to strive for all developments to be delivered to a high standard of energy and environmental efficiency. One large-scale initiative that will help us achieve this is through our proposals for a Smart Energy Network Demonstrator that you can read more about on page 19.

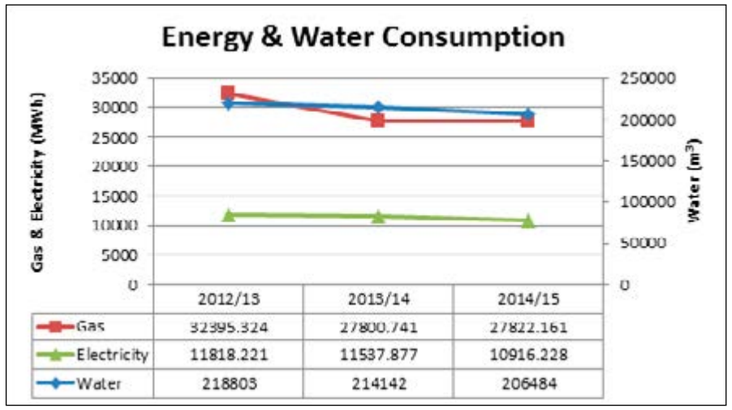
This section on Estates developments looks at energy and water consumption and carbon emissions and some of the recent major developments.

Utilities Consumption

In 2010, the Higher Education Funding Council for England, Universities UK and Guild HE published a carbon reduction target and strategy for higher education in England, which set a collective and ambitious 34% carbon reduction target by 2020, against a 1990 baseline for the University sector. This target is aligned with the UK Government's 2008 Climate Change Act and confirms the contribution that the sector will make to the UK's carbon reduction efforts. In the same year, Keele University published its first Carbon Management Plan which put in place a target to reduce its own emissions by 34% by 2020 and 80% by 2050 against its 1990 baseline. Importantly, it also set out a route map to achieving this along with an action plan which is updated annually.

Keele University is committed to this reduction in absolute carbon dioxide equivalent emissions, but the last two years have been challenging as the University is increasing the services and facilities on offer to students. The Carbon targets are based entirely on the 1990 data, irrespective of growth in student numbers (now about double the 1990 numbers), longer opening hours of some buildings (e.g. 24/7 opening for the library during term-time), and a greater number of buildings being included in the University's estate (for example the inclusion of the Innovation Centres since August 2012).

The following data shows the outturn of the utility use for the years 2013/14 and 2014/15 compared to the year 2012/13. The Innovation Centres are included in the figures both for 2012/13 and 2013/14. It should be noted that the year 2012/13 was comparatively colder against previous years hence had a higher gas consumption predominantly during the winter periods.



	2012/13	2013/14	2014/15
Gas	32395.324	27800.741	27822.161
Electricity	11818.221	11537.877	10916.228
Water	218803	214142	206484

To summarise the data, in 2013/14 gas consumption decreased against the previous year by 14% or 4,595 MWh, primarily as a result of a milder winter. At the same time electricity use came down by 2.4% or 281 MWh, largely as a result of installing several solar PV arrays and other efficiency initiatives. Water consumption also decreased over this time period by 2.2% or 4,661m^3.

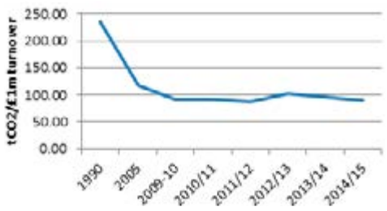
In 2014/15, gas consumption was static in comparison to the previous year despite analysis showing that the winter of this year was considerably colder than the previous year. This demonstrates not only that the efficiency of the University is improving but that ability to control the heating systems is getting better. Electricity use was down 5.4% due possibly to the implementation of the CHP unit which reduced the amount of electricity required from the national grid. Water consumption reduced by a further 3.6% on the 2013/14 year with this being at least partly the result of some water efficiency measures implemented in this year.

Carbon Emissions

Due largely to a reduction in utility consumption in the past two years our Carbon Dioxide equivalent (CO_2e) emissions for Scopes 1 & 2 (energy-related emissions) decreased year on year by 3.4% (436 tCO_2e) in 2013/14 and 5.9% (740 tCO_2e) in 2014/15 as shown in the figure below.

University Carbon Emmissions (tCO_2e)

This represents a decrease in absolute emissions of 7.7% from the 1990 baseline of 12,921 tCO_2e. Clearly this shows that we are some way from our 34% reduction by 2020. To allow a better understanding of the impact of the carbon reduction efforts to date, the University measures CO_2e emissions against turnover each year, as this is a good indicator of changes to activity levels on campus. This metric shows that the efficiency of the organisation has increased markedly since 1990 from 235tCO_2e/£1m to 88tCO_2e/£1m in 2014/15 and continues to increase year on year (shown in the figure below)[1].



Salix Fund

The University has participated in the SALIX fund which is used to implement energy saving projects that will pay back within five years. The savings are put back into the fund as they accrue to be used again on further energy and carbon reduction initiatives. Recently we have used the funds to upgrade the Horwood Energy Centre which incorporated a complete refurbishment of the heating and hot water generation equipment. This included a CHP (Combined Heat & Power generator - *pictured above right*) which is an engine used to create electricity but which also utilises the heat which would otherwise have been waste to provide heating and hot water. This unit delivers not only financial benefits but also results in lower carbon emissions as much less energy is lost in the process of creating electricity in comparison to large conventional power stations.

[1] Bank of England inflation rates used to normalise turnover figures to 2015 levels

HEFCE Revolving Green Fund 3

The University has also participated in the HEFCE Revolving Green Fund. As one example, in 2013 we received £340k to refurbish the library (with its 24h opening policy as requested by students) with low energy lighting. This is very similar to the Salix scheme in terms of how it is run and the rules which are applied for payback and technologies. The Library lighting refurbishment was completed in September 2014 and included presence detection controls rather than manual switching. This, along with more efficient luminaires giving better light output, greatly improved the lighting within the building whilst also reducing the electricity consumption considerably.

Carbon Reduction Commitment (CRC)

The University is required to participate in the Carbon Reduction Commitment (CRC), a national scheme which requires large organisations in the UK to measure and monitor their carbon emissions. This scheme was initially designed as a carbon trading process that encouraged energy efficiency and reduction, with repayments associated with league table performance. The University achieved its early targets: Automated Meter Reading (AMR) on all primary meters and a recognised energy efficiency accreditation, for Keele the Carbon Trust Standard (requiring year-on-year reduction in carbon emissions). Renewal of the Carbon Trust Standard was achieved in 2011, with the University achieving good assessment marks (90% in all categories). However, the government then withdrew the repayment element of the CRC scheme. The CRC scheme now functions as a tax on the amount of carbon that organisations emit, with payments based on a price agreed by the government annually. The scheme is now in its second phase whereby organisations can purchase allowances in advance at a discount to incentivise forecasting and trading between participants where appropriate.

CRC results

	2012/13	2013/14	2014/15
Reportable Carbon Emissions	12,690 tCO_2e	12,919 tCO_2e	13,411 tCO_2e
Credit Cost	£152,280	£155,028	£209,212

The rules for identifying and reporting emissions in the CRC are different from those used for the University carbon footprint therefore there are disparities between these figures and those within the carbon footprint. Generally reportable emissions have been increasing due to increased commercial activities and the reporting of domestic emissions. The total carbon credit costs have increased significantly as the National Government increased the cost of each credit from £12 in phase 1 (years 2011/12 to 2013/14) to a minimum of £15.60 in the first year of phase 2 (2014/15). The cost of credits is now rising each year to further incentivise organisations to become more efficient.

Key Developments

Display Energy Certificates (DEC)
The University is required to comply with the Display of Energy Certificates (DECs) and Energy Performance Certificates (EPCs) requirements under the European Energy Performance of Buildings Directive (EBPD). The main criterion that affects Keele University to date is the requirement to display DECs in buildings over 500 m^2 to which the public have access. For accommodation buildings, four are B rated and four are C rated; for academic and central services buildings, only one of these (the newest – Claus Moser building) is A rated (the highest rating), with most being C or D. This means that there are obviously opportunities for improving the energy efficiency of most of our buildings – although retro-fitting of energy-saving features can be very costly. In 2015 a further directive was introduced that reduces the minimum area to 250m^2 for which reports are required, so a significant number of our other buildings will require a DEC.

Automated Metering of Electricity
The University is able to monitor, through its own installed automated metering system, the electricity, gas and water consumption within virtually all buildings on campus. This allows for the detailed monitoring of the buildings' use, which is used to create monthly and annual consumption graphs to target improvements.

Solar PV
In 2013 the university completed a full feasibility study across campus for the installation of solar photovoltaic arrays. The University committed £300k to this project, and installed three 50KWp systems in March and April of 2013. These arrays are working well providing circa 120,000 kWh of free electricity per year, saving around 67 tonnes of CO_2 per year and providing a cost saving of circa £15k from the generation of our own electricity in addition to £15k from Feed-in-Tariff payments per year. In 2014/15 these arrays produced 124,552kWh of electricity providing just over 1% of the total campus site electricity annually.

ISO 50001 and Energy Management
Keele University decided in 2012 to obtain an accreditation for Energy Management by embarking on the implementation of an Energy Management System (EMS) and subsequently applied to be certified to the internationally-recognised standard, ISO 50001:2011.

In September 2013 after having the Energy Management System audited by an accredited assessor Keele was certified to meet the requirements of the standard. The certification lasts for three years during which time the assessor revisits periodically to ensure compliance of the standard is maintained and to highlight any areas for improvement. The EMS currently covers a combination of academic buildings, classrooms, lecture theatres, restaurants/cafes, teaching labs, kitchens and the estates activities for the academic buildings and encompasses the work environments of approximately 2,000 staff and 10,000 students.

Keele was one of the first universities in the UK to have its Energy Management System certified to this prestigious quality standard and having implemented the system it will assist in achieving continual improvement in the management of energy used across campus.

Estates and Development has been committed to a renewable/sustainable energy strategy over many years. The University was first awarded accreditation of the Energy Efficiency Accreditation Scheme in 1999, with renewals in 2003, 2006 and 2008, and was one of the first UK universities to achieve the Carbon Trust Standard in 2008, with renewal achieved in 2011. Additionally results from last year's figures for the national Estate Management Statistics indicated Keele is fifth of all UK universities for value for money energy procurement.

Behaviour Change Campaigns

We have circa 3,000 students living on campus within the Halls of Residence which has a significant impact on energy and water use. In partnership with the NUS, we launched the 'Student Switch-off' scheme at Keele which aims to encourage students to think about energy consumption in their Halls of Residence. Student ambassadors have been recruited to champion this scheme and to encourage their fellow students to sign up to the project. Hall Points are awarded for the Hall that signs up the greatest number of students to the scheme. Throughout the year there are also regular competitions and events that have a specific Green theme and which enable further Hall Points.

A campaign is also run to encourage staff to adopt working practices which minimise energy consumption. The Green Impact scheme is administered by the National Union of Students and is detailed further in section 10.

Future Developments

The Estates & Development Directorate regularly undertake energy and water audits of all buildings on campus to identify areas of inefficiency and opportunities to reduce consumption. The results of these audits inform a master project list which contains all potential initiatives, allowing those that represent the best economic and carbon value to be brought forward as funding becomes available. From that list, over the last academic year we have implemented several projects as shown in the table at the bottom of the page.

Going forward, more than 80 energy and water saving projects have been identified to be considered as and when funding becomes available. Amongst these initiatives the following have been identified which demonstrate both a significant financial and carbon benefit and are currently at the feasibility stage:

1. PV Panels on Innovation Centres 1-4 delivering a financial payback in 7 to 9 years and saving 70 tonnes of CO_2e
2. CHP at Lindsay Halls of Residence delivering financial payback in 4 years and saving 360 tonnes of CO_2e
3. ICT power management software which would allow the dynamic control of most computers and network equipment on campus

Title	Description	Annual Energy Saving	Annual Carbon Saving
Leisure Centre external lighting	Upgrade of the existing high intensity lighting with LED alternatives	65MWh Electricity	22 tCO_2e
David Weatherall Building air handling unit	Installation of variable speed drives that will allow the motors to run slower at times of less demand	12MWh Electricity	7 tCO_2e
David Weatherall car park lighting	Replacement of inefficient lighting column heads in the car park with high efficiency LED	6MWh Electricity	3 tCO_2e
Sports Centre lighting replacement	Removing inefficient lighting from within two sports halls in the sports centre and replacing with LED and appropriate motion controls	80MWh Electricity	43 tCO_2e
Barnes accommodation block pipework lagging	Installation of insulation to valves, flanges and cylinders in seven plant rooms to reduce heat loss	257MWh Gas	48 tCO_2e
Lenard Jones external lighting	Replacement of high intensity floodlighting with LED	7MWh Electricity	4 tCO_2e
Lenard Jones vacuum plant replacement	Installation of electric pump system to replace water units	23,000 m^3 Water	24 tCO_2e

7. SMART ENERGY NETWORK DEMONSTRATOR (SEND)

As evidenced in the contents of this report, sustainability is a priority at Keele University. By taking action now, the University aims to become more energy self-sufficient with increased carbon saving, whilst also becoming a national research and development facility that is undertaking world-leading research in environmental sustainability. In order to achieve this, the University plans to work with graduates, academics and businesses to create a smart energy network demonstrator - a 'living laboratory' where new energy-efficient technologies can be researched, developed and tested in a 'real world' environment.

Enabled by commitment from the Department of Business, Innovation and Skills and the Department of Energy and Climate Change as part of the Stoke-on-Trent & Staffordshire 'City Deal' signed by Government at Keele University in 2014, Keele is designing the first 'at scale' smart energy network demonstrator in Europe.

This Government investment, alongside targeted co-investment from the European Regional Development Fund, the University and the private sector, will deliver a world-class demonstrator facility for smart energy network research and development, enabling collaboration with business and industry, and the testing and evaluation of new and evolving smart energy network technologies and services. This represents a significant investment over the next five years.

The demonstrator will build on the University's privately-owned and managed smart energy network infrastructure, optimise energy distribution and improve the management of a range of building-based and campus-wide on-site renewable or lower carbon energy sources, such as wind, solar and geothermal.

The demonstrator will use a wide range of renewable and lower carbon energy sources in order to meet the network's energy needs and allow the energy to be transferred across the network accordingly.

The Keele University campus is a unique model because of the diverse range of activities within it – 3,100 students in halls of residence, 1,000 commercial users on the Science and Innovation Park, 200 'standard' domestic households, and academic activities serving around 10,000 students. The demonstrator will be divided into five zones that can be monitored and controlled separately – this will be a European first and will allow other comparable communities to assess how to install more efficient, sustainable and secure energy using a local energy network.

The University is seeking to appoint two new professorial roles to both lead the development of the demonstrator and to head a new collaborative research and development centre with business and industry, capitalising on this significant investment. This will include establishing a collaborative doctoral training centre with business and other universities leading to the development of new smart energy products and services, higher value job growth in partner businesses and a significant contribution to national greenhouse gas reduction commitments.

Implementation of the smart energy network demonstrator is set to commence in 2017 and it is expected that, once established, the network will have the potential to save between 2,900 and 9,200 tonnes of Carbon Dioxide each year, create up to 440 jobs and support the UK renewables sector.

Keele's unique campus with commercial, domestic, academic uses and halls of residence makes it an ideal site for the first 'at scale' smart energy network demonstrator in Europe

8. WASTE AND RECYCLING

Waste management within the University has a key role to play in meeting the University's sustainability objectives, through minimising waste generated, maximising the potential of materials through reuse, recycling and energy recovery, and reducing greenhouse gas emissions by diverting waste from landfill. The University's waste management strategy follows the waste hierarchy.

Biffa Waste Services Ltd were re-appointed as our waste contractor during 2014 following a competitive tendering exercise. They are responsible for the regular collection of the majority of waste generated on a day-to-day basis. Biffa have made a commitment to work in partnership with Keele University to meet our ambitious waste and recycling targets. One key environmental improvement made in 2014 has been that none of the University waste is sent direct to landfill but is either reused, recycled or recovered by the waste contractor as the first option. This in practice means that less than 1% of the University's waste goes to landfill.

Our main waste streams and disposal routes include:

- Dry mixed recycling (paper, cardboard, plastics and cans) - recycled
- Glass - recycled
- Food waste - green energy generated from Anaerobic Digestion (off-site)
- Waste cooking oil - reused as biodiesel offsite
- Green waste - composted offsite
- General Waste - Refuse Derived Fuel (RDF) / Energy from waste

Waste management performance

2014/15 Academic Year
Total Waste Mass Recycled = 536.98 Tonnes

Total waste Mass Composting = 250.88 Tonnes

Total Waste Mass Anaerobic Digestion = 45.71 Tonnes

Total Waste Mass used to create Energy = 635.12 Tonnes

Total Waste Mass = 1468.71 Tonnes

Annual Recycling Rate = 57%

In 2014 we concentrated our recycling efforts within the academic and central services buildings, engaging with staff through the Green Impact scheme. This has included improving recycling signage, introducing one recycling bin where previously the recycling was split into two recycling streams. With the support of Cleaning Services we have also introduced single occupied office recycling bins to make recycling more convenient, where previously only communal recycling bins were available. Unfortunately the focus had dropped from the Halls of Residence and recycling levels in Halls had reduced to as low as 15% during 2014 due to lack of engagement from students and high contamination levels. Since this disappointing result we have ensured the recycling message is clearer for students living in Halls of Residence and also introduced glass recycling. The recycling figures at the start of the 2015/16 academic year are encouraging at over 30% recycling. Our aim is to reach 50% recycling.

To support raising recycling levels within the Halls of Residence recycling is included within the 'Halls Life' program. Each month the Halls will be allocated Hall Points (5 = 1st place to 1 = 5th place) as per the greatest volume of recycling collected each month.

Office Furniture Reuse

We have developed the process for ensuring redundant office furniture and equipment is offered to be reused within the University or donated to local charities that renovate and redistribute the furniture, and we have raised awareness of this scheme. Not only does this reduce our environmental impact but it also provides much needed support to local charities and those in need. However, charities often don't want some items and will not accept upholstered furniture without a valid fire label so we do still occasionally see furniture and other items in our general waste. We will need to search for other routes to dispose of these items more sustainably.

"Green Move out"

Keele's 'Green Move Out' was an initiative run for the first time in 2014, aiming to reduce the amount of items thrown out at the end of the year from Halls of Residence through collecting unwanted items from students and putting them to good use. During the summer move out period, student volunteers helped to collect unwanted items from students leaving Halls of Residence. The following items were collected and redistributed in the first year:

- Over 100 books to be reused
- 25 large boxes of kitchen items (crockery, cutlery, saucepans, baking trays, utensils) to be reused by short term international students visiting Keele University
- Over 50 bed sheets, blankets and towels that were donated to the City Dogs Home in Stoke on Trent
- Over 200 kg of food which was taken to a local food bank

There have been some issues coordinating the collections of donated items on time as the Halls of Residence have to be vacated within 48 hours for refurbishments and preparation for summer vacation guests. We will be reviewing different options for the 2017 scheme which may include providing temporary storage for the donated items.

British Heart Foundation Collections

Keele University has teamed up with British Heart Foundation Shops (BHF) to encourage students to donate unwanted clothes and other items and help generate vital stock for the BHF shops. All proceeds go towards the fight against heart disease and fund the BHF's life-saving research. Keele University and the BHF are urging both students and staff to raid their wardrobes and donate any items that are no longer wanted. BHF Shops are always in need of clothing, shoes, accessories, CDs, DVDs, books, and kitchenware. In 2014 Keele University students donated over 2 tonnes of their unwanted items to BHF, raising over £7,000 for the charity. The scheme has been promoted further and grown which has resulted in a huge improvement in the 2015 donations trebling to 8 Tonnes and raising around £13,000 for the British Heart Foundation (BHF). This is a fantastic effort by the students, local volunteers and the accommodation team at Keele.

9. TRANSPORT AND TRAVEL

Keele's semi-rural location and position on top of a hill make sustainable transport a challenge. The University is always looking for ways to make the travel of staff, students, and visitors to and from Keele more sustainable.

As well as being an integral part of the University's aims for environmental sustainability and health and wellbeing, there is a practical need to reduce the number of vehicles travelling to and from campus because car parking capacity will not be able to increase with the aspirations for campus growth.

Green Travel Plan

JMP Consultants Limited were commissioned by Keele University to review current transport and movement infrastructure issues at the University and advise on future travel and transport planning, and movement infrastructure requirements in order to address current issues as well as providing for the planned expansion of the University as part of its Strategic Plan for the period 2015-2020.

A student and staff travel survey was undertaken to gain a better understanding of their current travel patterns and the reasons for their current travel behaviour as well as possible changes in their travel patterns. As a result of this survey the University are considering a number of new initiatives that will form the basis of a new travel plan. The recommendations are focused around 4 key areas:

- Car parking
- Public Transport
- Campus Improvements
- Cycling improvements

Many of the initiatives within the Green travel plan will be to improve the current schemes that are already in place. Some of the successful initiatives introduced over the past two years include:

Keele Key Bus Ticket

New for 2016 has been the introduction of the **Keele Key Bus Ticket**, making it more convenient and better value for money for Keele staff and students to travel by bus. The Keele key bus ticket is ONE ticket that can be used on any ***First Potteries*** or ***D&G*** bus in Newcastle-under-Lyme and Stoke-on-Trent. Giving unlimited travel on both operators' buses there's no need to buy multiple tickets.

Car Sharing

In 2014 the university launched the 'Keele University Car Share Scheme', as a simple, cost effective and environmentally friendly way to travel to and from work. The scheme is designed to suit both regular and occasional car sharers and there is a simple and secure way for staff to find potential car sharers living in their local area. The car share scheme allows regular car sharers to split the cost of a parking permit and to park in a conveniently located marked car parking space of their choice. Occasional car sharing permits are also available for those who choose to car share now and again but would still like the option of being able to utilize the convenient car share parking spaces. More information about the car share scheme is available on the Green:Keele webpages: **www.keele.ac.uk/estates/transportandtravel**

Cycling Initiatives

Keele is proactive in supporting cycling as a vital aspect of sustainable transport, and cycling facilities have been increased and upgraded in recent years to make it more convenient and more rewarding for staff and students to cycle to and from Keele and around the Keele campus. The University provides facilities for staff and students to store bikes securely, to borrow bikes, to store cycle kit in lockers and to shower both body and bike on campus. Travel Smart is an initiative which provides many free cycling-related activities at Keele, including: regular bike repair and servicing, leisure rides led by CTC qualified trail leaders, cycle and commuter confidence training, try-bike road shows where you can try out the latest range of bikes and accessories, and various cycle challenges. Keele also has a bicycle users group (Keele Cyclists) which aims to allow cyclists to give collective feedback to the University on how cycling can be supported and encouraged and allows cyclists to meet and support one another. For more information about any of the above and to connect with other cyclists at Keele, visit the Keele Cyclists webpages: **www.keele.ac.uk/kc**

With further funding from the Local Sustainable Transport Fund (LSTF), Staffordshire based cycling training provider 'Velo-M' loaned 21 bikes to Keele students last term. The loan bike scheme has been very successful and continued into 2014/15 with more students taking advantage of the scheme. There are also a number of further activities planned to promote and support cycling.

Free bike maintenance service on campus

10. GREEN IMPACT

The Green Impact scheme, led by the National Union of Students, has been running for several years and used by over 50 Higher Education and Further Education institutions. It puts a structure in place for individuals to create small changes that together have a big impact on the institution's sustainability.

Individuals create teams within buildings and directorates, and use a simple online workbook to drive changes in order to gain Bronze, Silver or Gold accreditation. The academic department and directorate that gets the most points receive the institution's top award. The criteria cover areas of sustainability from energy to procurement.

Green Impact, which launched in 2013 at Keele, aims to provide a structure and support for staff as individuals and teams to feel empowered and able to take action on sustainability within their own department or building. The first year was seen as a real success both in terms of engagement of staff and students, as well as sustainability outcomes, and has been re-launched every year since. Keele recruited the largest number of teams in its first year of operation of the Green Impact scheme of any university taking part in the NUS Green Impact initiative.

The impact of the Green Impact scheme has been more than just environmental. It has led to much greater staff and student engagement with the sustainability agenda, and has provided staff development opportunities to learn more about sustainability and its meaning to Keele and their roles. As well as making physical sustainability improvements to their working environments Green Impact has also encouraged teams to consider issues around sustainability in the university's core activities of education and research. The Green Impact work book has been modified to increase the focus on education for sustainability in addition to considering more sustainable laboratory management practices.

Results from 2013-14

- 21 teams engaged from different Schools and directorates, giving ~ 50% coverage of the campus
- These teams covered an estimated 990 staff, of which over 100 were directly involved in a Green Impact committee or team
- 826 criteria were completed in Keele's Green Impact workbook, with 502 criteria completed specifically as a result of the Green Impact initiative
- 3 teams were accredited with the Working Towards standard; 9 teams gained the Bronze award, 6 teams reached the Silver accreditation and 3 teams achieved a Gold standard
- 22 Student auditors and 14 Green Impact Project Assistants were trained, and supported staff teams to enact change, giving the students invaluable professional development opportunities.

Results from 2014-15

For the year 2014/15 over 100 committed staff signed up to take part in Green Impact, comprising over 18 teams. These teams were supported by over 20 students. There was a slight reduction in the number of teams taking part in this year due to several of the previous year's teams being involved in office relocations, meaning they felt they were unable to take part for this year. Although there were three fewer teams overall compared to the previous year it was great to see two new teams take part from the Marketing and Communications Directorate, and Keele Hall Catering and Conferencing. In 2014/15 two teams were accredited with the Working Towards standard; 10 teams gained the Bronze award, two teams reached the Silver accreditation and four teams achieved a Gold standard

Launch of the 2015/16 Green Impact scheme

After a successful two years we reviewed the Green Impact scheme to think how we could improve engagement going forward. Some of the feedback we had was that established teams would prefer to spend more time on their own innovative projects. Therefore for 2015/16 we streamlined the workbook criteria and introduced an 'excellence' category so that teams can concentrate on a project that they have created themselves.

Afternoon tea at a Green Impact awards ceremony

Case Studies

School of Psychology (RePSYclers): A session working the land
One criteria included in the bronze award is for staff to take part in an advertised session about sustainability. There are several opportunities for sessions around campus such as the regular Keele Arboretum Walks led by natural historian Dave Emley, having a Sustainability Hub Tour, a Keele Heritage Tour, or visiting the Walled Garden for an introduction to the project. The RePSYclers team, involving staff and postgraduate students from the School of Psychology, spent a lunchtime digging and planting potatoes in the allotments in the walled garden. They found this to be a great team building exercise and learnt a bit about growing potatoes at the same time!

The Law School (Jolly Green Judges): Student Representation of Sustainability Issues
The School of Law believe that bad environmental practice is not due to apathy,

Psychology Green Impact team working at the Keele allotments"

but due to a lack of awareness and lack of convenience. As part of a large academic department they felt they needed to communicate not only with staff, but also with students to overcome some of the problems they found. Alongside making changes to assignment submission requirements so that students could print double-sided, they also issued guidance to module/course leaders to highlight to students that hand-outs need not be printed for classes except to support those with access requirements.

They also created a new Green Student Ambassador role (to compliment the work of Student Academic Representatives – 'StARs') in the hope that the following year they would have a student who could liaise with the team and facilitate a two-way dialogue between staff and students about further sustainable innovation in the School. The team increased the impact of this work, by working with the Students' Union, who run the StARs programme to develop and roll out the Green Student Representative scheme across the institution.

Human Resources and Department of Occupational Health and Safety (Green Shoots): Utilising Student Project Assistants
The Green Shoots team did a lot of work on building sustainability information into the induction of new staff and increasing the provision of information for existing staff. One of the major projects the team decided to undertake in this area was to use the environmental background of their student project assistants to help them design and test a new e-learning course entitled 'Introduction to Environmental Sustainability'. This was created for their team, and has subsequently been rolled out across the University as an online 'Learning Pool' module.

11. SUSTAINABLE PROCUREMENT

Sustainable procurement is the mechanism by which the procurement team are demonstrating improvements across the procurement cycle at the University.

To focus activity the team have adopted the Flexible Framework (FF) and have set a target to achieve Level 4 on the Framework by the end of 2016. The North West Universities Procurement Consortium (which accounts for 28% of spend) have recently achieved Level 4, as have a small group of sector leaders.

The Flexible Framework is a tool developed for procurement professionals to support embedding sustainability into procurement practice.

The Flexible Framework focusses on key areas of procurement: policy and strategy; people development; the procurement process; supplier engagement; and measurement of impact. This provides an appropriate framework for our activity.

Progress to date

- Developed and progressed an action plan outlining the steps needed to progress to Level 4
- Identified strategic commitments to sustainability that strengthen our mandate and support our developing narrative
- Built team confidence and competence
- Identified where in the procurement cycle processes and practices need to be updated
- Developed a simple communications plan
- Use of NETpositive Sustainability Analysis to assess all commodities when available

Other key achievements include:

- Sustainability forms part of the Pre-Qualification Questionnaire process and documentation
- Sustainability is part of all tenders
- Consolidating deliveries for Desktop and Laptop computers to once a week, significantly reducing the CO_2e emissions
- Launched a sustainability supplier engagement tool which has been sent to all Keele University suppliers. Each supplier has to complete their own bespoke sustainability action plan to address key sustainability issues within their business.

Although there is still work to do we are confident we have made a good start and are on target with the actions that are in our direct control.

12. SUSTAINABLE CATERING

The University Catering has been working with the Soil Association to implement the Food for Life Catering Mark that awards caterers who:

- Serve fresh food
- Source environmentally sustainable and ethical food
- Make healthy eating easy, and
- Champion local food producers

The Soil Association will undertake a full assessment in autumn 2016 and have been very positive with the practices already in place, some of which are highlighted below.

Menus

The catering team have reviewed the menus and introduced more vegetarian and vegan options to the daily menu. Every Wednesday in the Refectory has also been dedicated as Vegan Wednesday after working with the Vegetarian and Vegan Society to incorporate more vegan dishes into the menu.

Work continues on providing a range of healthier options, with homemade fruit and vegetable juices having been introduced into ***Chancellors' Café***, in addition to extended gluten free choices, reduced fat and sugar dishes and generally greater availability of fruit.

Local sourcing

The catering team constantly strive to purchase local produce, and procure cheeses from ***Staffordshire Organic Cheeses*** only four miles from Keele. Fruit and vegetables are delivered daily from ***Freshview Foods*** who are based in Wolstanton just 4 miles away. ***Freshview*** is able to source locally grown fruit and vegetables including strawberries, herbs, root vegetables and potatoes along with micro cress varieties, lettuces and tomatoes. Milk and dairy produce comes from ***Wells Farm Dairy*** who trade out of the village of Bradley near the county town of Stafford around 15 miles away from Keele. They select milk from a collective of dairy farms from Staffordshire and Cheshire.

Sustainable fish

We currently purchase cod, haddock, hake, salmon and hoki fish from sustainable sources and all are Marine Stewardship Certified (MSC). As more MSC fish becomes available we are looking to introduce this into our menus.

Fairtrade

In August 2014, the University was successful in having its Fairtrade Status renewed. The Fairtrade Foundation said:

> *"We are delighted to renew Keele University's Fairtrade Status and thank you for your continuing hard work and support. Keele University is clearly committed to Fairtrade, and this shows in your success in upholding and surpassing the 5 goals. Well done."*

Fairtrade wine has also been added to our wine menu, offering all guests the option to choose this as an alternative.

The Fairtrade Steering Group which comprises staff from a wide range of University departments, members of Keele Students' Union, and a number of students, organise events for Fairtrade Fortnight.

Free range eggs

The catering department has been purchasing Free Range Eggs since 2007 from ***Hungerford Farm Eggs*** situated just 10 minutes away in the village of Madeley. The University was recognised with the 'Good Egg' Award in 2012.

Drinking water

Every catering department now has 'tap' drinking water freely available to its customers.

13. OUTREACH AND THE SUSTAINABILITY HUB

The Sustainability Hub is a centre facilitating education, research and demonstration in sustainability and clean technology. Since its opening in October 2011 it has continued to attract a growing audience of visitors now approximately 10,000 visitors a year attending workshops and public lectures, outreach events, business events and activities.

As the energy demands of a growing population squeeze our planet's stretched resources, engaging the public in discussion about sustainability and energy has never been more important. Environmental awareness and science education have always been central to the Hub's mission. Public lectures are well-attended and have covered a wide range of topics including contaminated land reclamation, community energy, sustainable construction and beekeeping.

We're very proud of our Courtyard Garden which has won silver in the local Newcastle in Bloom Competition Community Projects category winning a prize in this competition for two years in a row. The raised beds have recently been redesigned and are arranged in four themes, Medicinal, Geology, Astropyhsics and Life Sciences. This new garden has been created to represent our Faculty of Natural Sciences. Visitors are often surprised to see that some flowers are edible and we continue to try to source heritage and unusual native plants. Our Bee Friendly garden continues to attract many bumble bees, butterflies and other pollinators in the summer.

Keele Hub courtyard

The Hub also supports sustainability focussed careers . We have hosted three 8-week placements for the Pioneers into Practice Programme as part of the Climate-KIC, one of three Knowledge and Innovation Communities (KICs) created in 2010 by the European Institute of Innovation and Technology (EIT). The Pioneers, Lucia Kolar, an entrepreneur from Slovenia, Teodora Kristof from the Ministry of Rural Development, Department of Environmental Development Policy in Budapest and Piotr Szymanski from Wrocław University of Economics in Poland. Teodora and Piotr worked with the Sustainability Hub team developing outreach materials, researching sustainable food and clothing and the economics of environmental sustainability and climate change, assisting in the design of an activity for Spooktacular and helping with student teaching on undergraduate Entrepreneurship modules and the taught postgraduate Masters programme, Environmental Sustainability and Green Technology. Lucia's project was about reducing the use of materials and pharmaceuticals used in healthcare, medicine and veterinary care.

Business links to the Hub have been crucial to the success of the public engagement activities and the education programmes at the Hub. The MSc in Environmental Sustainability and Green Technology had input from Schott Solar UK, Siemens, McCamley UK Ltd, Dorothy Clive Gardens, Sharenergy, Wardell Armstrong, Clearfleau and Marston's. Students on the MSc carried out projects in a variety of subjects including anaerobic digestion, hydroelectricity schemes, recycling and waste, sustainable building and behaviour and transport choices. The Hub was chosen as a venue to meet various VIPs including Greg Clark, then Minister for Science, Universities and Cities; and his Royal Highness the Duke of Gloucester who met some of the Hub team as well as representatives of the intergenerational community project, Grey Matters, and children from the local Friarswood Primary School and Newcastle-under-Lyme Sixth Form college. He interacted with the Ogden Trust sponsored Physicubes, viewed the newly installed Planet Trail meeting one of the planet sculptors, and talked to MSc and PhD students about their research. International visitors included representatives from the Libyan embassy as part of an educational collaboration where the Hub hosted a short technical residential course for 12 Libyan students.

The Sustainability Hub has become the venue of choice, not just for teaching and business meetings, but for a wider range of audiences who are now using the Hub for activities including meetings of the student Think Green Society, Geoconservation UK and the local Parish Council, as well as activities such as dance, martial arts and choir practice sessions.

Outreach at the Sustainability Hub

Science market for sixth formers
Keele University Sustainability Hub host numerous schools and colleges as part of its wider outreach activities. The Hub ran a successful one-day Chemistry at Work event funded by the Royal Society of Chemistry attended by around 150 pupils. Local employers from Johnson Matthey, Dermal Technologies Ltd and Erigal took part in the event. The Hub was also the venue for an innovative "TANGO Science Market" outreach event, which brought 60 sixth formers from six schools and colleges in the area for an interactive science demonstration day to learn about science careers and try out some hands-on science activities. This event was delivered by researchers from a range of countries on the Thermoacoustic and Aeroacoustic Nonlinearities in Green combustors with Orifice structures (TANGO) project led by Professor Maria Heckl.

Spectactular Spookiness

Science by Stealth at the annual Spooktacular event at the Sustainability Hub

The now annual Halloween Spooktacular is very popular, with over 150 children coming along for the day. Last year visitors took part in a session to calculate how sustainable vampires and zombies would be and also participated in a variety of laboratory sessions including making fake wounds, and slime, trying to identify stinks and smells and watching science experiments in pumpkins!

Family Fun Days
We love our community events and our Family Fun Days are always a hit! Happening each Wednesday in August - Families discover a world of science, keeping all ages entertained through hands-on educational activities and demonstrations. Families get tickled by creepy crawlies and learn how beneficial our insects are, explore the amazing world around them from volcanoes to our oceans, find out about what amazing machines our bodies are and how we should look after them before jumping into our Stardome to experiencing our wonderful planets and stars!

Be More Entrepreneurial + Be More Sherlock

The Hub has been involved in the 'Be More' weeks, where Keele puts on a range of activities, workshops and events that are fun, quirky and will help students to develop their graduate attributes.

One green event took the format of a 'Dragons' Den' pitch, this involved three sessions, building up to students developing a business plan for a green product or enterprise, and covering issues of sustainability in business. A special 'Be More Sherlock' sustainable murder mystery evening was also held.

Grey Matters
Project 'Grey Matters' is an outreach initiative which is aimed primarily towards the 'ageing' (50+) local community. The project provides a meeting facility and access to education programmes for this community, where they can engage in various educational activities and be actively involved in the Keele campus community. The older generation have a lot to offer in terms of experience in sustainability and a key feature of the project is intergenerational exchange of experience and knowledge. Consisting of a programme of events and workshops, Grey Matters has so far covered a range of subjects from recycling to beekeeping, wildlife, astrophysics and the environment.

The Planet Trail
The Hub's solar planet trail has been installed thanks to the help of two local artist; Charis Jones of Sculpted Steel, and Denise O'Sullivan of Denise O'Sullivan Ceramics. At an opening ceremony Dr Sharon George led guests along the trail, which links the Space Observatory and the Sustainability Hub, and there was also a visit to the Space Observatory, hosted by Dr Jacco Van Loon. The evening ended with an illustrated talk about the solar system and Keele search for exoplanets planets delivered by Professor Rob Jefferies in the Stardome.

To Infinity & Beyond!
To Infinity & Beyond is a Royal Institution inspired demonstration lecture exploring how astronauts travel to space, and then, how they survive this hostile environment. Physics fundamentals such as Newton's Laws of Motion, Gravity and Pressure are tackled head on in an exciting format, engaging the audience at every opportunity with a range of eye catching practical demonstrations.

Having fun at a Family Fun Day

The TANGO science market

The Planet trail

The Solar Scrapheap Challenge
The Solar Scrapheap Challenge is a workshop designed to bring together elements of physics, engineering, electronics and environmental sustainability, originally designed by the Science for Sustainability environmental education group run by Dr Zoe Robinson and Professor Mark Ormerod.

Students are presented with a range of equipment, such as cables, crocodile clips, solar cells and capacitors as well as a set of basic instructions, in order to construct a solar powered vehicle. The theory behind Solar PV cells is explored along with the environmental impact/benefits of moving towards a carbon free energy landscape.

The Physicubes
The Physicubes are Perspex boxes containing the necessary apparatus and instructions to perform a set of scientific experiments relating to a number of physical phenomena. The Physicubes can be used either as a classroom aid to support a topic or as a standalone resource to create or enrich a science fair or to enhance an open day. The Physicubes add excitement and intrigue to the topics of power, energy, computer programing, photovoltaic cells, electrical circuits and the electromagnetic spectrum. Examples of some of the cubes are given below:

- Stirling Work

A simple attractive Stirling engine design that demonstrates how energy is converted from one form (heat) to another (movement). During use a vocal recording explains how the display works.

- What is Watt?

"What is Watt?" helps students gain insight into energy generation and consumption. Using our Pedal-A-Watt bike, students attempt to light as many halogen bulbs as possible. Their results are displayed onto a screen where they discover whether or not they have produced enough energy to power other household appliances.

- Solar Thermal

Students taking part in this hands-on-activity learn about the principles and efficiency of solar collectors.

Eco-detectives workshops

Eco Detectives is a series of punchy hands-on workshops designed to highlight the importance of scientific research within relatable environmental contexts. These include how to clean up an oil spill, the environmental impact of sunscreens, river pollution and the consequences of salting our road network. Collectively, these workshops give students the opportunity to utilise novel scientific equipment as well as design, conduct and ultimately evaluate their own scientific experiments. Examples include:

- An Oil Spill – Can you contain it?

Oil is transported around the world on very large ocean going vessels, but what happens if the ship begins to sink? Students create their own chocolate oil slick and are required to design innovative ways in which to clean up the spill.

- Suncreams and the Ocean

We all know we should wear suncream when out in the sun. But what effect does it have if you go for a dip in the sea? Students test the environmental impact of suncream on our oceans and seas using UVA & UVB sensors.

- River Pollution – Bottoms up!

In the style of a Bear Grylls survival exercise, students are presented with three different river water samples, one of which they must drink to stave off dehydration, but which one do you choose? Students analyse the samples for pH and oxygen levels and consider the impact of pollution and oxygen on aquatic life.

- Salty Verge – To grit or not to grit!

During the winter months the UK road network is heavily gritted to ensure the roads remain passable. But what happens to the salt once it has been spread on the road? Students test soil samples from a local roadside for salinity.

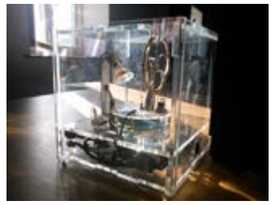
- Microbeads - In focus

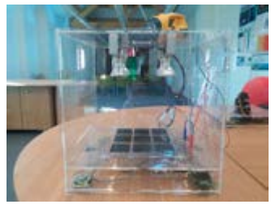
Micro plastics have found their way into a large number of beauty products over recent years, but what is the environmental cost of this? Students analyse a beauty product containing micro plastics (used to help exfoliate the skin) under the microscope and compare and contrast this with grains of sand. What effect does this plastic have on the environment and how might it affect us as human?

- Biomass Ash – A chip too far?

Keele Sustainability Hub utilises a biomass boiler for some of its hot water requirements, but what is left behind when you burn the wood chips? In an attempt to be more carbon neutral, are we in fact creating a bigger (waste) problem? Students will investigate the microscopic properties of this biomass ash, what causes this and how we can dispose of this waste as safely as possible.

For more information about the Sustainability Hub contact: **keelehub@keele.ac.uk**





Examples of the physicubes

Equipment at the ready to be an 'eco-detective'!

14. COMMUNICATION

Internal communication of sustainability developments and the celebration of activity from around the campus is an essential part of creating a sustainability culture for the University. With this in mind a range of different communication media are being used to engage staff, students and local residents with sustainability issues at the university.

The Green: Keele newsletter has been produced three times a year and circulated electronically to all staff and students. Staff and students contribute articles on green-related events, activities and programmes.

A sustainability forum is held at least once each year. These events are for anyone within the Keele community, including staff, students and local residents, who would like the opportunity to discuss green issues on campus. At the forum there are a range of related staff, including representatives from the Education for Sustainability team, Sustainability Hub, and Students' Union, in addition to the environmental manager, and the University's Strategic lead for sustainability who are available to discuss key environmental and sustainability issues within the university, and to take forward suggestions that arise.

News and events are also updated through the Green:KeeleTwitter and Facebook and posted on the "green noticeboard" located outside the Students' Union.

The Green:Keele website (**www.keele.ac.uk/greenkeele**)is kept up to date with events and with resources including Keele University's sustainability plans and policies, undergraduate and postgraduate programmes and modules, and ongoing projects, and links to the work of Estates and the Sustainability Hub. The website also includes an extensive list of resources on how to embed sustainability in the curriculum for a wide range of disciplines.

Join us on @GreenKeele

Join us on www.facebook.com/GreenKeele/

15. STEERING GROUP AND CONTACTS

The Environment and Sustainability Steering Group oversees sustainability developments across the University ranging from the curriculum, to enterprise and outreach to the estates and grounds. The members of the steering group are shown below. In addition to this there are a number of associate members of the group with responsibility for different areas which contribute to the overall sustainability of the campus and its operations.

Environment and Sustainability Steering Group members		
Professor Mark Ormerod	Deputy Vice Chancellor and Provost; Strategic lead for Environment & Sustainability	**r.m.ormerod@keele.ac.uk**
Phil Butters	Director of Estates and development	**p.butters@keele.ac.uk**
Dr Zoe Robinson	Director of Education for Sustainability; Reader	**z.p.robinson@keele.ac.uk**
Huw Evans	Environmental Manager	**h.a.evans@keele.ac.uk**
Dr Sharon George	Sustainability Hub Manager; Lecturer	**s.m.george@keele.ac.uk**
Jane Barker	Head of Grounds	**j.barker1@keele.ac.uk**
Elliot Jones	Energy Manager	**e.jones1@keele.ac.uk**
Dr Ian Madley	Head of Partnership Development (Natural Sciences)	**i.c.madley@keele.ac.uk**
ESSG Associate members		
Linda Sutton	Procurement Manager	**l.sutton@keele.ac.uk**
Susan Warrender	Head of Catering and Retail	**s.j.warrender@keele.ac.uk**
David Emley	Keele Arboretum co-ordinator	**d.w.emley@keele.ac.uk**

Green:Keele website: **www.keele.ac.uk/greenkeele**

To learn more about the University's commitment to the environment and sustainability visit:

www.keele.ac.uk/greenkeele

Report prepared by the 'Environment and Sustainability Steering Group', July 2016